FUEL CELL DISASSEMBLY METHOD AND FUEL CELL

Examiner: Adam Arciero S.N. 10/584,342 Art Unit: 1795 May 7, 2010

Detailed Action

1. The Applicant's amendment filed on October 20, 2009 was received. Claims 1, 13, 15 and 20 have been amended. Claims 14 and 22 are canceled.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in a prior Office Action.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

4. Authorization for this Examiner's amendment was given in a telephone interview with Mr. Jeremy Tillman on May 7, 2010.

The application has been amended as follows:

Claim 1 now recites: "A fuel cell disassembly method of disassembling a fuel cell, the fuel cell comprising: an electrode assembly having an electrolyte interposed between a pair of electrodes; sealing layers located to surround a periphery of the electrode assembly; and a pair of

separators arranged across the electrode assembly and bonded to the sealing layers, where one of the separators facing one of the electrodes has a fuel gas conduit, while the other of the separators facing the other of the electrodes has an oxidizing gas conduit, said fuel cell disassembly method comprising the step of:

supplying a specific fluid (which is referred to as a fluid supply for disassembly of the fuel cell) to at least one of the oxidizing gas conduit and the fuel gas conduit to facilitate separation of the electrode assembly from the pair of separators, wherein the fluid supply for disassembly of the fuel cell comprise one of more members selected from the group consisting of one or more organic solvents and water, wherein the specific fluid is supplied to heighten an in-passage pressure of at least one of the oxidizing gas conduit and the fuel gas conduit over a level of in-passage pressure level during power generation by the fuel cell, and wherein the specific fluid has a function of lowering an adhesive force of the sealing layers."

Claim 13 now recites: A fuel cell disassembly method that disassembles a layered body of multiple fuel cells having a coolant sealing layer, which prevents leakage of a coolant from a coolant conduit formed either between adhesion faces of each pair of adjoining fuel cells or between adhesion faces of each fuel cell and each coolant conduit separator, said fuel cell disassembly method comprising:

a coolant removal step of supplying a fluid to the coolant conduit in the course of disassembly of the fuel cells of the layered body to remove at least part of the coolant from a space between the adhesion faces of each pair of adjoining fuel cells or from a space between the adhesion forces of each fuel cell and each coolant conduit separator, and

a fluid supply step after the coolant removal step,

the fluid supply step supplying a fluid supply for disassembly of the fuel cell to at least one of the oxidizing gas conduit and the fuel gas conduit formed in the layered body of the fuel cells to facilitate disassembly of at least part of the fuel cells of the layered body,

wherein the fluid supply for disassembly of the fuel cell comprises one of more members selected from the group consisting of one or more organic solvents and water,

wherein the fluid supply for disassembly of the fuel cell is supplied to heighten an in-passage pressure of at least one of the oxidizing gas conduit and the fuel gas conduit over a level of in-passage pressure during power generation by the layered body of the fuel cells and the fluid supply for disassembly of the fuel cell has a function of lowering an adhesive force of the coolant sealing layer,

supplying a specific fluid (which is referred to as a fluid supply for disassembly of the fuel cell) to at least one of the oxidizing gas conduit and the fuel gas conduit to facilitate separation of the electrode assembly from the pair of separators, wherein the fluid supply for disassembly of the fuel cell comprise one of more members selected from the group consisting of one or more organic solvents and water, wherein the specific fluid is supplied to heighten an in-passage pressure of at least one of the oxidizing gas conduit and the fuel gas conduit over a level of in-passage pressure level during power generation by the fuel cell, and wherein the specific fluid has a function of lowering an adhesive force of the sealing layers."

Claim 15 now recites: "A fuel cell that generates electric power through reaction of a fuel gas with an oxidizing gas, said fuel cell comprising:

an electrode assembly having an electrolyte interposed between a pair of electrodes;

sealing layers located to surround a periphery of the electrode assembly;

a pair of separators arranged across the electrode assembly and bonded to the sealing layers, where one of the separators facing one of the electrodes has a fuel gas conduit, while the other of the separators facing the other of the electrodes has an oxidizing gas conduit, and

a breaking guide that is formed in each of the separators to function as a starting point of breakage of the separator triggered by a fluid supply for disassembly of said fuel cell to supply a fluid to at least one of the fuel gas conduit and the oxidizing gas conduit to heighten an in-passage pressure of at least one of the oxidizing gas conduit and the fuel gas conduit over a level of in-passage pressure level during power generation by the fuel cell,

wherein at least either boundaries between the sealing layers and the separators or boundaries between the sealing layers and the electrode assembly are made of a functional material having an adhesion force that is lowered by a fluid supply to at least one of the fuel gas conduit and the oxidizing gas conduit for disassembly of the fuel cell,

wherein the fluid supply is a fluid supply for disassembly of the fuel cell different from a power generation fluid supply of said fuel cell, and wherein the fluid supply for disassembly of the fuel cell comprises one or more members selected from the group consisting of one or more organic solvents and water."

Claim 20 now recites: “A fuel cell that generated electric power through a reaction of a fuel gas with an oxidizing gas, said fuel cell comprising:

an electrode assembly having an electrolyte interposed between a pair of electrodes;

sealing layers located to surround a periphery of the electrode assembly;

a pair of separators arranged across the electrode assembly and bonded to the sealing layers, where one of the separators facing one of the electrodes has a fuel gas conduit, while the other of the separators facing the other of the electrodes has an oxidizing gas conduit, and

a breaking guide that is formed in each of the separators to function as a starting point of breakage of the separator triggered by a fluid supply for disassembly of said fuel cell to supply a fluid to at least one of the fuel gas conduit and the oxidizing gas conduit to heighten an in-passage pressure of at least one of the oxidizing gas conduit and the fuel gas conduit over a level of in-passage pressure level during power generation by the fuel cell,

wherein the fluid supply for disassembly of the fuel cell comprises one or more members selected from the group consisting of one ore more organic solvents and water."

Election/Restrictions

5. Claims 13 and 15-21 are directed to an allowable product. Pursuant to the procedures set forth in MPEP § 821.04(B), claims 17, 19-21 and 23-24, directed to the process of making or using an allowable product, previously withdrawn from consideration as a result of a restriction requirement, are hereby rejoined and fully examined for patentability under 37 CFR 1.104.

Because all claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, **the restriction requirement as set forth in the Office action mailed on May 20, 2008 is hereby withdrawn**. In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable

in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Claim Rejections – 35 USC § 103

6. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over May et al. and Breault et al. on claims 1-3, 5, 8-9 and 11-12 are withdrawn, because the claims have been amended.

7. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over May et al., Breault et al. and Iwase et al. on claim 10 is withdrawn, because the claims have been amended.

Reasons for Allowance

8. Claims 1-3, 5, 8-13 and 15-21 are allowed. The following is an examiner's statement of reasons for allowance: The invention of independent claims 1 and 13 are directed to a disassembly method for disassembling a fuel cell comprising: supplying a specific fluid (which is referred to as a fluid supply for disassembly of the fuel cell) to at least one of the oxidizing gas conduit and the fuel gas conduit to facilitate separation of the electrode assembly from the pair of separators, wherein the fluid supply for disassembly of the fuel cell comprises one or more members selected from the group consisting of one or more organic solvents and liquid water, wherein the specific fluid is supplied to heighten an in-passage pressure of at least one of the

oxidizing gas conduit and fuel gas conduit over a level of in-passage pressure level during power generation by the fuel cell, and wherein the specific fluid has a function of lowering an adhesive force of the sealing layers.

The inventions of claims 15 and 20 are directed to a fuel cell comprising breaking guides formed in the separators of said fuel cell, wherein said breaking guides provide a specific function as a starting point of breakage triggered by a fluid supply to at least one of the fuel gas conduit or oxidizing gas conduit to heighten an in-passage pressure level of said conduits over a level of in-passage pressure level during power generation of the fuel cell.

The closest prior arts of record, May et al., Breault et al. and Iwase et al., teach supplying a specific fluid comprising water vapor to the fuel gas conduit and oxidizing gas conduit of a fuel cell. However, the closest prior arts of record do not teach or suggest wherein the fluid supply for disassembly of the fuel cell is supplied to heighten an in-passage pressure of at least one of the oxidizing gas conduit and fuel gas conduit over a level of in-passage pressure level during power generation by the fuel cell, and wherein the specific fluid has a function of lowering an adhesive force of the sealing layers wherein the sealing layers comprise breaking guides to function as a starting breakage point when an in-passage pressure level higher than that of a pressure level during power generation is obtained.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM A. ARCIERO whose telephone number is (571)270-5116. The examiner can normally be reached on Monday to Friday 8am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795